

Art. 19
Amendment

Amendment

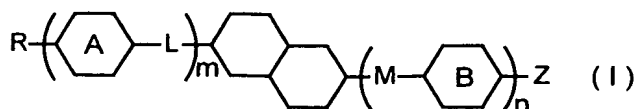
09/763531
under Art. 19 PCT

358

528 Rec'd PCT/PTO 28 FEB 2001

CLAIMS

1. (Amended) A composition represented by general formula (I):



(wherein, R and Z may be substituted with a halogen and represent alkyl groups or alkoxy groups having 1-16 carbon atoms, alkenyl groups having 2-16 carbon atoms, alkenyloxy groups having 3-16 carbon atoms, alkyl groups having 1-12 carbon atoms substituted with an alkoxy group having 1-10 carbon atoms, hydrogen atoms, fluorine atoms, chlorine atoms, trifluoromethoxy groups, difluoromethoxy groups, trifluoromethyl groups, 3,3,3-trifluoroethoxy groups, cyano groups, cyanato groups, hydroxy groups or carboxy groups, m and n may be the same or different and respectively and independently represent an integer of 0-2, $m+n \leq 3$, L and M may be the same or different and respectively and independently represent $-\text{CH}_2\text{CH}_2-$, $-\text{CH}(\text{CH}_3)\text{CH}_2-$, $-\text{CH}_2\text{CH}(\text{CH}_3)-$, $-\text{CH}_2\text{O}-$, $-\text{OCH}_2-$, $-\text{CF}_2\text{O}-$, $-\text{OCF}_2-$, $-\text{COO}-$, $-\text{OCO}-$, $-\text{CH}=\text{CH}-$, $-\text{CF}=\text{CF}-$, $-\text{C}\equiv\text{C}-$, $-(\text{CH}_2)_4-$ or a single bond, rings A and B when present may be the same or different and respectively and independently represent a trans-1,4-cyclohexylene group in which one CH_2 group or more than one non-adjacent CH_2 groups in the group may be replaced by $-\text{O}-$ or $-\text{S}-$, a 1,4-phenylene group in which one CH_2 group or more than one non-adjacent CH_2 groups in the group may be replaced by $-\text{N}=\text{}$, a 1,4-cyclohexenylene group, 1,4-bicyclo(2,2,2)octylene group, piperidine-1,4-diyl group,

Abstract

iv. case in which either m or n represents 1, the other m or n represents 0, ring A or ring B when present represents a non-substituted 1,4-phenylene group, L when present represents -OCO- or M when present represents -COO-, L or M when present

SECRET

10

15.

20

25

Art. 19
Amdt.

substituted alkoxy group, and R or Z bonded to a naphthalene-2,6-diyl group represents a non-substituted alkyl group or cyano group;

viii. case in which n represents 2, m represents 0, R represents a non-substituted alkyl group, M when present adjacent to a decahydronaphthalene ring represents -COO-, at least one of rings B present represents a non-substituted 1,4-phenylene group, and Z represents a non-substituted alkyl group or bromine atom, or the case in which at least one of rings B present represents a pyrimidine-2,5-diyl group, and Z represents a non-substituted alkyl group, alkoxy group or cyano group;

ix. case in which m and n represent 1, ring A represents a trans-decahydronaphthalene-trans-2,6-diyl group or a 1,4-cyclohexylene group, ring B represents a non-substituted 1,4-phenylene group or 1,4-cyclohexylene group, L represents a single bond, M represents -COO-, -OCO-, -CH₂O- or -OCH₂-, and R and Z represent non-substituted alkyl groups; and,

applying similarly to compounds equivalent to the above using combinations of the abbreviations).

2. A compound according to claim 1 wherein, ring A and ring B when present respectively and independently represent a 1,4-phenylene group, naphthalene-2,6-diyl group, 1,2,3,4-tetrahydronaphthalene-2,6-diyl group, trans-1,4-cyclohexylene group or decahydronaphthalene-2,6-diyl group that may be substituted with fluorine atom(s).

3. A compound according to claim 1 wherein, ring A or ring B when present respectively and independently represent a 1,4-phenylene group or trans-1,4-cyclohexylene group that may be substituted with fluorine atom(s).

5

4. A compound according to claim 1 wherein, L and M when present represent $-\text{CH}_2\text{CH}_2-$, $-\text{CH}_2\text{O}-$, $-\text{OCH}_2-$, $-\text{CF}_2\text{O}-$, $-\text{OCF}_2-$, $-\text{COO}-$, $-\text{OCO}-$, $-\text{CF}=\text{CF}-$ or a single bond.

10

5. A compound according to claim 1 wherein, L or M represents a single bond.

6. A compound according to claim 1 wherein, L and M represent single bonds.

15

7. A compound according to claim 1 wherein, $1 \leq m + n \leq 2$.

8. A compound according to claim 1 wherein, R represents an alkyl group, alkoxy group, alkenyl group or alkenyloxy group having 1-12 carbon atoms.

20

9. A compound according to claim 1 wherein, Z represents a halogen atom or an alkyl group, alkoxy group, alkenyl group, alkenyloxy group or cyano group having 1-12 carbon atoms.

25

10. A compound according to claim 1 wherein, R represents an alkyl group or alkenyl group having 1-12 carbon atoms, m

21
1 represents 1, n represents 1, ring A represents a trans-1,4-cyclohexylene group, ring B represents a 3-fluoro-1,4-phenylene group or 3,5-difluoro-1,4-phenylene group, L and M represent single bonds, and Z represents a fluorine atom,
5 chlorine atom, trifluoromethoxy group, difluoromethoxy group, trifluoromethyl group, 3,3,3-trifluoroethoxy group or cyano group.

10 11. A compound according to claim 1 wherein, R represents an alkyl group or alkenyl group having 1-12 carbon atoms, m represents 0, n represents 1, ring B represents a 3-fluoro-1,4-phenylene group or 3,5-difluoro-1,4-phenylene group, M represents a single bond and Z represents a fluorine atom,
15 chlorine atom, trifluoromethoxy group, difluoromethoxy group, trifluoromethyl group, 3,3,3-trifluoroethoxy group or cyano group.

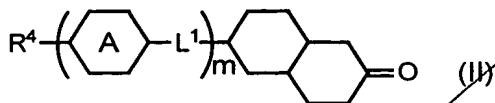
20 12. A compound according to claim 1 wherein, R and Z represent alkyl groups or alkenyl groups having 1-12 carbon atoms, m and n represent 1, rings A and B represent 1,4-phenylene groups or trans-1,4-cyclohexylene groups, and L and M represent single bonds.

25 13. A compound according to claim 1 wherein, R and Z represent alkyl groups or alkenyl groups having 1-12 carbon atoms, at least one of R or Z represents an alkenyl group, m represents 1, n represents 0, rings A and B represent 1,4-

T06220" T559/60

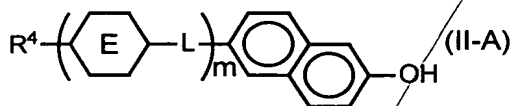
phenylene groups or trans-1,4-cyclohexylene groups, and L represents a single bond.

14. A compound represented by general formula (II):



5 (wherein, R^4 represents an alkyl group, alkoxy group, alkenyl group, alkenyloxy group or alkoxyalkyl group, L^1 represents $-\text{CH}_2\text{CH}_2-$, $-\text{CH}(\text{CH}_3)\text{CH}_2-$, $-\text{CH}_2\text{CH}(\text{CH}_3)-$, $-\text{CH}_2\text{O}-$, $-\text{OCH}_2-$, $-\text{CF}_2\text{O}-$, $-\text{OCF}_2-$, $-\text{COO}-$, $-\text{OCO}-$, $-\text{CH}=\text{CH}-$, $-\text{CF}=\text{CF}-$, $-\text{C}\equiv\text{C}-$, $-\text{O}(\text{CH}_2)_3-$, $-(\text{CH}_2)_3\text{O}-$, $-(\text{CH}_2)_4-$ or a single bond, R^4 represents an alkenyl group, alkenyloxy group or alkoxyalkyl group when L^1 represents a single bond, ring A and m are the same as defined in general formula (I), and the decahydronaphthalene ring has a trans form).

15. A production method of general formula (II) according to claim 14 including: reducing a compound represented by general formula (II-A):

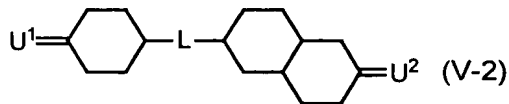


(wherein, R^4 is the same as previously defined in general formula (II), ring E represents a 1,4-phenylene group or trans-1,4-cyclohexylene group, L and m are the same as previously defined in general formula (I), and the decahydronaphthalene ring has a trans form), and oxidizing the

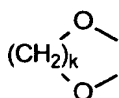
Art. 19
Amend.

hydroxyl group as necessary.

16. (Amended) A compound represented by general formula (V-2):

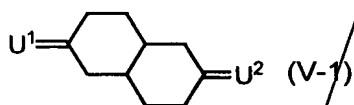


(wherein, U^1 and U^2 respectively and independently represent an
5 oxygen atom or the following structure:

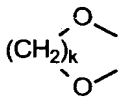


(wherein, k represents an integer from 1 to 7), L is the same
as previously defined in general formula (I), and the
decahydronaphthalene ring has a trans form).

10 17. (Amended) A production method of general formula (V-2)
according to claim 16 or general formula (V-1):



(wherein, U^1 and U^2 respectively and independently represent an
oxygen atom or the following structure:



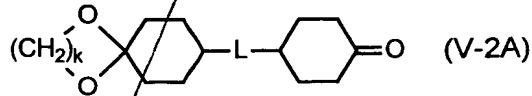
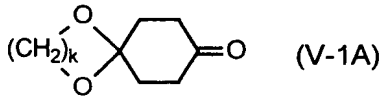
(wherein, k represents an integer from 1 to 7), L is the same
15 as previously defined in general formula (I), and the
decahydronaphthalene ring has a trans form)

the method including: converting a compound represented
by general formula (V-1A) or general formula (V-2A):

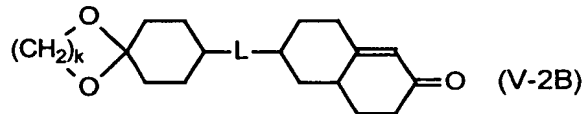
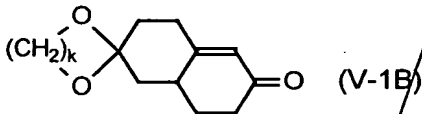
106620 1659/60

Art. 19
Amend.

366

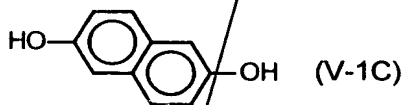


(wherein, k is the same as previously defined in general formula (V-2), and L is the same as previously defined in general formula (I)) into an enamine using a secondary amine, and reacting it with methyl vinyl ketone to obtain a compound represented by general formula (V-1B) or general formula (V-2B)



(wherein, k is the same as previously defined in general formula (V-2), and L is the same as previously defined in general formula (I)) followed by reductive hydrogenation.

18. (Amended) A production method of general formula (V-1) according to claim 17 including: reducing a compound represented by formula (V-1C) by hydrogen in the presence of metal catalyst:

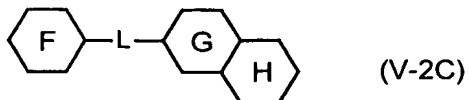


oxidizing the hydroxyl groups as necessary, and protecting the carbonyl groups as necessary.

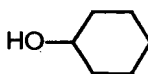
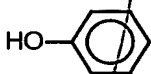
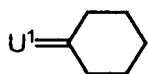
Art. 19
And:

366A

19. A production method of general formula (V-2) according to claim 16 including: reducing a compound represented by general formula (V-2C):



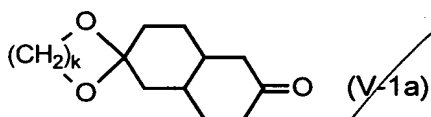
(wherein, although ring G represents a cyclohexane ring or
5 benzene ring, a single bond(s) of the cyclohexane ring may be replaced by double bond(s), and although rings F and H respectively and independently represent the following structures:



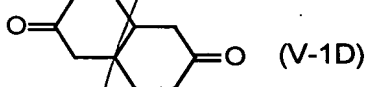
09763531.02301
T0E220" 1E5E9/50

(wherein, U^1 is the same as previously defined in general formula (V-1) or general formula (V-2)), a single bond(s) of the cyclohexane ring may be replaced by double bond(s)), oxidizing the hydroxyl group as necessary, and further
 5 protecting the carbonyl group as necessary.

Sub 24
 20. A production method of general formula (V-1a):



10 (wherein, k is the same as previously defined in general formula (V-1) or general formula (V-2)), which is one of the structures of general formula (V-1) according to claim 16, including monoacetalation of a compound represented by general formula (V-1D):



15 21. A liquid crystal composition containing a compound according to any of claims 1 through 13.

22. A liquid crystal device having for its constituent feature the liquid crystal composition according to claim 14.

Sub 23
 20 23. An active matrix drive, liquid crystal device that uses the liquid crystal composition according to claim 14.

24. A super twisted nematic liquid crystal device that uses the liquid crystal composition according to claim 14.

T.03.20.1.55.3.60